



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,495	02/20/2004	Yung-Cheng Chen	N1085-00251 [TSMC2003-083]	2148
54657 7590 07/17/2009 DUANE MORRIS LLP (TSMC) IP DEPARTMENT 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103-4196			EXAMINER NORTON, JENNIFER L	
			ART UNIT 2121	PAPER NUMBER
			MAIL DATE 07/17/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Advisory Action Before the Filing of an Appeal Brief	Application No. 10/783,495	Applicant(s) CHEN ET AL.	
	Examiner Jennifer L. Norton	Art Unit 2121	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 01 July 2009 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.
 b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
 (b) ☐ They raise the issue of new matter (see NOTE below);
 (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
 (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
 5. ☐ Applicant's reply has overcome the following rejection(s): _____.
 6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
 7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
 The status of the claim(s) is (or will be) as follows:
 Claim(s) allowed: _____.
 Claim(s) objected to: _____.
 Claim(s) rejected: _____.
 Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
 9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
 10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:
See Continuation Sheet.
 12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____.
 13. ☐ Other: _____.

/Ramesh B. Patel/
 Primary Examiner, Art Unit 2121

Continuation of 11. does NOT place the application in condition for allowance because: Applicant's arguments see Remarks pgs. 6-13, filed 01 July 2009 with respect to claims 1 and 3-22 under 35 U.S.C. 103(a) have been fully considered but they are not persuasive.

In regards to Applicant's argument that U.S. Patent No. 6,825,912 (hereinafter Park) does not teach, "using a thickness variation or thickness of a first layer to control the exposure energy uses in patterning a different layer." (Remarks, pg. 8, paragraph 2), the Examiner recognizes the Applicant has not accounted for the combination of Park and U.S. Patent 6,630,362 (hereinafter Lensing) under 35 U.S.C 103(a) for this limitation as set forth in the Final Office Action, mailed on 01 May 2009.

Furhermore, Park teaches "During processing, a wafer is first provided to a pre-exposure step process. In the pre-exposure step process 10, a silicon-nitride film is preferably deposited uniformly on the surface of a wafer. Next, the wafer is provided to a photo-exposure process 20. In the photo-exposure process 20, a photoresist is formed over a whole surface of the wafer, and then baking, exposing, and developing are sequentially performed. After the development portion of the photo-exposure process, the wafer then progresses to the after-development inspection (ADI) process 30, which inspects and measures a line width of the photoresist pattern formed after the photo-exposure process 20. The wafer is then transferred to the next process using a photoresist mask such as an etching or an ion implantation process." (col. 4, lines 59-67 and col. 5, lines 1-5)

"In the silicon-nitride depositing pre-exposure step process 10, the reflectivity and thickness of the silicon-nitride film, etc. act as parameters that influence the photo-exposure process. Therefore, values obtained for these factors are provided to the pre-exposure step influence prediction unit 40.

In the photo-exposure process 20, information regarding the photo-exposure time is provided to the photo-exposure unit 50 together with other conditioning parameters, such as characteristics of the photoresist material and light source, baking temperature and time, development conditions, and so on. It is desirable that a photo-exposure time be classified and managed with the unique number of reticles because photo-exposure time may vary by reticles even in the same step and equipment." (col. 5, lines 13-28)

Lensing teaches "The computer system 430, in conjunction with the manufacturing model 440, adjusts the recipe of the stepper 515 to correct the nonconformity. For example, if the intensity measurement on the periphery 162 of the wafer 105 (see FIG. 1) is greater than the intensity measurement in the middle 164, the line width is presumably less, because a smaller line width causes less scattering. To correct the line width variation, the computer system 430 changes the recipe of the stepper 515 such that the exposure sites (e.g., individual die or groups of die) with smaller line widths receive either an increased energy exposure or a longer duration exposure." (col. 6, lines 56-67)

In summary, Park teaches to using a thickness variation or thickness of a first layer (i.e. a silicon-nitride film) to control the exposure uses in patterning a different layer (i.e. photoresist); and Lensing teaches to controlling exposure energy (i.e. controlling the exposure energy of the stepper). Hence, Park in view of Lensing teaches to Applicant's claimed limitation "using a thickness variation or thickness of a first layer to control the exposure energy uses in patterning a different layer"

In regards to Applicant's argument that Park does not teach, "controlling the exposure energy" (Remarks, pg. 9, paragraph 2), the Examiner recognizes the Applicant has not accounted for the combination of Park and Lensing under 35 U.S.C 103(a) for this limitation as set forth in the Final Office Action, mailed on 01 May 2009.

In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Lensing teaches "Scatterometry measurements can also be made on shallow trench isolation (STI) structures. The thickness of silicon dioxide, using tetraethoxysilane (TEOS), used to fill STI structures 240 can be measured using the scatterometry techniques listed above. Scatterometry data is processed and correlated by the system 400. The scatterometry data is then analyzed by the scatterometry error analysis unit 170. The results from the scatterometry error analysis unit 170 can be used to adjust polishing processes of TEOS layers and fillings in STI structures." (col. 7, lines 23-32; i.e. Lensing teaches to controlling the exposure energy in semiconductor manufacturing to detect variations and adjust parameters of equipment in the manufacture of semiconductors to correct nonconformity)

Furthermore, Park teaches "Another object is to provide a system for adjusting a photo-exposure time capable of enhancing a uniformity of a photoresist pattern by reflecting a feedback of factors to be compensated obtained from a post-exposure evaluation of the photo-exposure result and a feed forward of factors to be cured, obtained before a photo-exposure process." (col. 2, lines 50-55)

"During processing, a wafer is first provided to a pre-exposure step process. In the pre-exposure step process 10, a silicon-nitride film is preferably deposited uniformly on the surface of a wafer. Next, the wafer is provided to a photo-exposure process 20. In the photo-exposure process 20, a photoresist is formed over a whole surface of the wafer, and then baking, exposing, and developing are sequentially performed. After the development portion of the photo-exposure process, the wafer then progresses to the after-development inspection (ADI) process 30, which inspects and measures a line width of the photoresist pattern formed after the photo-exposure process

20. The wafer is then transferred to the next process using a photoresist mask such as an etching or an ion implantation process. (col. 4, lines 59-67 and col. 5, lines 1-3)

"In the photo-exposure process 20, information regarding the photo-exposure time is provided to the photo-exposure unit 50 together with other conditioning parameters, such as characteristics of the photoresist material and light source, baking temperature and time, development conditions, and so on. It is desirable that a photo-exposure time be classified and managed with the unique number of reticles because photo-exposure time may vary by reticles even in the same step and equipment." (col. 5, lines 20-28)

"an inspection unit for generating an inspection value by measuring an aspect of the semiconductor device after it has been subjected to the photo-exposure step, and providing the inspection value as feed back data;" (col. 8, lines 56-59)

In summary, Park teaches to a feedback process that adjusts (i.e. compensates) a plurality of factors, as well as, providing the photo-exposure process with information regarding exposure time together with other conditioning parameters, such as characteristics of the photoresist material and light source, baking temperature and time, development conditions, and so on. Hence, Park teaches to adjusting a plurality of parameters in a semiconductor process, and providing a photo-exposure process with a variety of conditioning parameters.

Claims 1 and 3-22 stand rejected under 35 U.S.C. 103(a) as set forth in the Final Office Action mailed on 01 May 2009.